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EXAMINER

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Appeal 2008-1483
Application 09/896,432
Technology Center 3600

Before: WILLIAM F. PATE, III, HUBERT C. LORIN and
STEVEN D.A. McCARTHY, *Administrative Patent Judges.*

DECISION ON APPEAL

1 STATEMENT OF THE CASE

2 The Appellants appeal under 35 U.S.C. § 134 (2002) from the final

3 rejection of claims 1-14. We have jurisdiction under 35 U.S.C § 6(b)

4 (2002). We AFFIRM.

The claims on appeal relate to the perforation of a casing string in a well to provide fluids contained in a subterranean formation access to the interior of the casing. (Spec. 1, ll. 14-16 and 6, l. 21 – 7, l. 1). Claim 1 is typical of the appealed claims:

1. A detonation device for selectively perforating a tubular with a designated explosive charge located downhole in a well bore, said device comprising:

- the tubular;
- the designated explosive charge attached to the tubular;
- a wireless receiver;
- microprocessor and control means connected to said wireless receiver;
- an explosive bridge wire;
- high voltage supply means; and energy storage and trigger means, whereby a coded signal received by said wireless receiver is decoded by the micro processor and, if the code designates that the respective explosive charge is to be detonated, sends a signal to the trigger means which will supply high voltage to explosive bridge wire which will create sufficient energy to initiate detonation of the respective explosive charge and thereby perforating the tubular.

ISSUES

The issues before us are whether the Appellants have shown that the Examiner erred in:

rejecting claims 1-5 and 7 under 35 U.S.C. § 103(a) (2002) as being unpatentable over Snider (Publ. WO 00/65195, published 2

1 Nov. 2000) in view of Guerreri (U.S. Patent 4,884,506, issued 5 Dec.
2 1989);

3 rejecting claim 6 under § 103(a) as being unpatentable over
4 Snider in view of Guerreri and Neyer (U.S. Patent 6,234,081, issued
5 22 May 2001);

6 rejecting claims 8-12 and 14 under § 103(a) as being
7 unpatentable over Snider in view of Abouav (U.S. Patent 5,090,321,
8 issued 25 Feb. 1992) and Guerreri, alone or further in view of
9 Umphries (U.S. Patent 5,295,544, issued 22 Mar. 1994); and

10 rejecting claim 13 under section 103(a) as being unpatentable
11 over Snider in view of Abouav, Guerreri and Neyer, alone or further
12 in view of Umphries.

13 These issues turn, at least in part, on whether: (1) Snider and Guerreri
14 are analogous art; (2) the Examiner has articulated reasoning sufficient to
15 support the conclusion that the detonation devices of claims 1-5 and 7 would
16 have been obvious from the teachings of Snider and Guerreri along with
17 common knowledge in the art regarding the use of exploding bridge wire
18 detonators; and (3) whether the Examiner has articulated reasoning sufficient
19 to support the conclusion that the methods of claims 8-12 and 14 including
20 the step of attaching an explosive charge in direct contact with the tubular
21 would have been obvious from the teachings of Snider, Abouav, Guerreri
22 and Umphries.

23

24 FINDINGS OF FACT

25 The record supports the following findings of fact (“FF”) by a
26 preponderance of the evidence.

1 1. Snider teaches a method including the steps of positioning a
2 perforating gun assembly in a subterranean well bore outside of the casing
3 and detonating an explosive charge in the perforating gun assembly to
4 penetrate the casing wall. (Snider 12, ll. 4-7).

5 2. Snider further teaches detonating charges in multiple
6 perforating guns positioned adjacent subterranean zones of interest
7 simultaneously, sequentially or in any desired order by transmitting suitable
8 electrical, hydraulic or acoustic signals to the guns. (Snider 14, ll. 10-14).

9 3. In particular, the reference teaches igniting the charges by
10 sending electromagnetic signals through the casing, the soil or the well bore
11 fluids to receivers connected to the perforating guns. (Snider 9, ll. 22-28).

12 4. Snider teaches securing a perforating gun to a casing by means
13 of stainless steel bands or specialty connectors. (Snider 9, ll. 6-12).

14 5. Guerreri teaches a detonating system which includes a
15 command unit and one or more control units. (Guerreri, col. 3, ll. 19-21).

16 6. Each control unit includes a radio receiver for receiving radio
17 signals from the command unit and a processor-decoder means for
18 recognizing signals containing an identifying code provided to the unit. (*Id.*;
19 Guerreri, col. 4, ll. 15-22, 27-29 and 52-57).

20 7. The processor-decoder means places the control unit on alert
21 status in response to wireless arming signals including the control unit's
22 identifying code. (Guerreri, col. 4, ll. 57-61 and col. 5, ll. 21-25).

23 8. The processor-decoder means of the alerted control units
24 subsequently arm firing mechanisms of the control units and signal the firing
25 mechanisms to detonate explosive charges in response to arming and firing

1 signals sent from the command unit. (Guerreri, col. 4, ll. 18-22; col. 5, ll.
2 50-56; and col. 6, ll. 40-50).

3 9. Guerreri teaches that the radio signals sent by the command
4 unit to the control units must be distinctive so that the control units do not
5 place themselves on alert status, arm their firing mechanisms or detonate
6 their explosive charges in response to random signals or signals directed to
7 other control units. (Guerreri, col. 4, ll. 22-27).

8 10. Guerreri teaches that the “firing mechanism itself is of
9 conventional type.” (Guerreri, col. 6, ll. 57-60). In Guerreri’s preferred
10 firing mechanism, activation of a switch causes a capacitor to discharge into
11 a firing circuit so as to cause an electric blasting cap to detonate an explosive
12 charge. (Guerreri, col. 6, ll. 60-63).

13 11. Umphries discloses a six-way decentralized casing hole
14 puncher. (Umphries, col. 3, ll. 58-61).

15 12. Umphries teaches controlling the explosive force of a
16 perforation charge by varying the distance between the charge and the casing
17 wall. (Umphries, col. 2, ll. 29-32).

18 13. In particular, the reference teaches that the force generated
19 when the charge is spaced a short distance away from the casing wall will be
20 more of a destructive force whereas the force resulting from the intimate
21 contact of the explosive charge with the casing wall will be more of a
22 deformation force. (Umphries, col. 5, ll. 14-22). The reference further
23 teaches placing the explosive charge in intimate contact with the wall of a
24 pipe casing so as to punch the inner casing only and not a protective casing
25 surrounding the pipe casing. (Umphries, col. 5, ll. 9-14).

1 PRINCIPLES OF LAW

2 A claim is unpatentable for obviousness under 35 U.S.C. § 103(a) if
3 “the differences between the subject matter sought to be patented and the
4 prior art are such that the subject matter as a whole would have been obvious
5 at the time the invention was made to a person having ordinary skill in the
6 art to which said subject matter pertains.” In *Graham v. John Deere Co.*,
7 383 U.S. 1 (1966), the Supreme Court set out factors to be considered in
8 determining whether claimed subject matter would have been obvious:

9
10 [U]nder § 103, the scope and content of the prior
11 art are to be determined; differences between the
12 prior art and the claims at issue are to be
13 ascertained; and the level of ordinary skill in the
14 pertinent art resolved. Against this background,
15 the obviousness or nonobviousness of the subject
16 matter is determined.
17

18 *Id.*, 383 U.S. at 17.
19

20 ANALYSIS

21 A. *The Rejection of Claims 1-5 and 7 Under § 103(a) as Being*
22 *Unpatentable Over Snider in View of Guerreri*

23 The Appellants contest the rejection of claims 1-5 and 7 together in
24 the Appeal Brief. (App. Br. 9.) We select claim 1 to be representative of the
25 group. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2007). The Appellants contend
26 that: (1) Snider and Guerreri are not analogous art (App. Br. 10-11; Reply
27 Br. 4-5); (2) there is no suggestion to combine the teachings of Snider and
28 Guerreri (App. Br. 10; Reply Br. 3); and (3) neither Snider nor Guerreri

1 teaches an explosive bridge wire detonator (App. Br. 11). We sustain this
2 ground of rejection.

3 At the outset, we emphasize that the issue of whether cited prior art is
4 analogous is separate from the issue of whether the Examiner has articulated
5 reasoning to sufficient to support combining the teachings of the references.
6 The established precedent of our reviewing court sets up a two-fold test for
7 determining whether art is analogous: “First, we decide if the reference is
8 within the field of the *inventor*’s endeavor. If it is not, we proceed to
9 determine whether the reference is reasonably pertinent to the particular
10 problem with which the *inventor* was involved.” *In re Deminski*, 796 F.2d
11 436, 442 (Fed. Cir. 1986) (emphasis added).

12 The single passage from Snider cited by the Appellants in support of
13 their contention that Snider is nonanalogous art (*see* App. Br. 10; Reply Br.
14 5) suggests that Snider lies within the Appellants’ field of endeavor rather
15 than without. Comparing this passage to the preamble of claim 1, we
16 conclude that the Appellants have not shown that the Examiner erred in
17 finding that Snider is analogous art.

18 The Appellants contend that Guerreri is not within the field of the
19 Appellants’ endeavor because the teachings of Guerreri address the problem
20 of remotely detonating explosives in environments having high levels of
21 extraneous electricity (Guerreri, col. 2, ll. 14-17) and any extraneous
22 electrical fields in a well bore tubular would not be as strong as those in an
23 urban area as described by Guerreri. (App. Br. 10). We conclude that the
24 teachings of Guerreri are within the Appellants’ field of endeavor. Both the
25 subject matter of claim 1 and the teachings of Guerreri relate to detonation
26 devices including wireless receivers and processors. (*See* FF 5-6). In both

1 the detonation device of claim 1 and the detonating system of Guerreri, a
2 coded signal received by the wireless receiver must be received and decoded
3 by the microprocessor before the explosive charge can be detonated. (*See*
4 FF 7-8). In Guerreri's system as in the device of claim 1, voltage supplied
5 by the trigger means creates sufficient energy to initiate detonation of the
6 explosive charge. (FF 10). Since the subject matter of claim 1 and the
7 system taught by Guerreri are similar in structure and function, the teachings
8 of Guerreri are within the Appellants' field of endeavor.

9 Even were Guerreri determined not to be within the Appellants' field
10 of endeavor, we would conclude that the teachings of Guerreri are pertinent
11 to a particular problem with which the Appellants are involved. The
12 Appellants, like Guerreri, are concerned with the remote detonation of
13 explosive charges. The Appellants state that advantages of the subject
14 matter of claim 1 include that "the coded signal allows selective detonation
15 of the explosive charges individually, in sequence, in patterns, etc., and the
16 wireless signal does not transmit the power to initiate detonation of the
17 explosive charge thereby reducing the risk of accidental detonation of the
18 explosive charge." (Spec. 10, ll. 15-18). Guerreri also addresses the
19 problem of reducing the risk of accidental detonation. (FF 9). Therefore,
20 one of ordinary skill in the art would have looked to the teachings of
21 Guerreri for guidance in addressing at least one problem with which the
22 Appellants were involved. Guerreri is analogous art.

23 Snider teaches detonating an explosive charge in a perforating gun
24 assembly positioned outside a casing wall in order to penetrate the wall. (FF
25 1). Snider further teaches remotely detonating explosive charges on multiple
26 perforating guns in sequence, that is, individually (FF 2) as well as

1 detonating such charges using radio signals received by radio receivers in
2 the perforating guns (FF 3). Guerreri describes a system using radio signals
3 to remotely initiate detonation of explosive charges and teaches that the
4 system reduces the risk that the radio signal will detonate the charges
5 simultaneously rather than individually. (FF 9). Therefore, we agree with
6 the Examiner (Ans. 4-5) that it would have been obvious to use a remote
7 detonating system according to the teachings of Guerreri to detonate charges
8 in Snider's perforating guns "in order to achieve the benefits of a wireless
9 system . . . as well as the desired effect of producing a blasting system,
10 which is comprised of a plurality of detonator assemblies that are
11 individually detonated by a wireless remote command source."

12 The Appellants do not appear to contest the Examiner's finding (Ans.
13 5-6) that explosive bridge wire detonators are conventional. Indeed, Hudson
14 (U.S. Patent 3,735,705, issued 29 May 1973) teaches that explosive bridge
15 wire detonators are commonly used pyrotechnic devices. (Hudson, col. 1, ll.
16 8-11).

17 "[W]hen a patent claims a structure already known in the prior art that
18 is altered by the mere substitution of one element for another known in the
19 field, the combination must do more than yield a predictable result." *KSR*
20 *Int'l*, 127 S.Ct. at 1740. The subject matter of claim 1 substitutes a remote
21 detonation system as taught by Guerreri (*see* FF 5) for the unspecified
22 structure taught by Snider for sending electromagnetic signals to detonate
23 the perforating charges (*see* FF 3); and further substitutes a firing
24 mechanism including a conventional explosive bridge wire detonator ignited
25 by the discharge of an undescribed energy storage and trigger means for a
26 firing mechanism including an electric blasting cap ignited by the discharge

1 of a capacitor as taught in Guerreri (*see* FF 10). The Appellants do not
2 appear to contest the Examiner's finding (Ans. 5) that "[i]t is considered
3 well within the level of knowledge of one of ordinary skill in the art to
4 substitute a wireless detonation system for a non-wireless system with the
5 associated microprocessors and other structures that make the system
6 wireless." (Ans. 5). Neither do the Appellants appear to contend that the
7 modification of Guerreri's firing mechanism to substitute an explosive
8 bridge wire detonator for an electric blasting cap would have been beyond
9 the ordinary skill in the art. No arguments or evidence have been brought to
10 our attention sufficient to demonstrate that the substitution of an explosive
11 bridge wire detonator into a detonating system as taught by Guerreri or the
12 use such a detonating system to detonate charges to perforate well casings as
13 taught by Snider would have produced unpredictable or unexpected results.

14 On the record before us, the Appellants have not shown that the
15 Examiner erred in rejecting claim 1 under § 103(a), that is, in concluding
16 that the subject matter of claim 1 would have been obvious from Snider and
17 Guerreri. Since the Appellants grouped claims 2-5 and 7 with claim 1 for
18 purposes of contesting this grounds of rejection, the Appellants also have not
19 shown that the Examiner erred in rejecting claims 2-5 and 7 under § 103(a).

20
21 *B. The Rejection of Claim 6 Under § 103(a) as Being*
22 *Unpatentable Over Snider in View of Guerreri and Neyer*

23 We addressed the Appellants' contentions that Snider and Guerreri are
24 nonanalogous art and that there is no suggestion to combine the teachings of
25 Snider and Guerreri in connection with our affirmance of the rejection of
26 claims 1-5 and 7 under § 103(a). The Appellants provide no reason why the

1 Examiner might have erred in rejecting claim 6. Therefore, on the record
2 before us, the Appellants have not shown that the Examiner erred in
3 rejecting claim 6 under § 103(a).

4

5 *C. The Rejection of Claims 8-12 and 14 Under § 103(a) as Being*
6 *Unpatentable Over Snider in View of Abouav, Guerreri and*
7 *Umphries*

8 The Appellants contest the rejection of claims 8-12 and 14 together in
9 the Appeal Brief. (App. Br. 9.) We select claim 8 to be representative of the
10 group. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2007). Setting aside contentions
11 already addressed in connection with our affirmance of claims 1-5 and 7
12 under § 103(a), the Appellants contend that Snider, Abouav, Guerreri and
13 Umphries fail to suggest attaching an explosive charge in direct contact with
14 the tubular. (App. Br. 12).

15 Snider teaches attaching a perforating gun (along with the charges
16 carried by the gun) to a casing. (FF 4). We agree with the Examiner (Ans.
17 12) that Umphries would have provided one of ordinary skill in the art a
18 design incentive to attach the perforating gun to the casing so as to place a
19 charge in intimate contact with a casing wall. By doing so, the one of
20 ordinary skill in the art could control the force of the explosive charge
21 against the casing. (FF 12-13). The Appellants do not appear to contend
22 that modifying Snider's perforating gun so as to place a charge in intimate
23 contact with the casing when the gun was attached to a casing would have
24 been beyond the ordinary skill in the art. Umphries' teachings themselves
25 would have provided one of ordinary skill in the art a basis for predicting the
26 results to be obtained by attaching an explosive charge in intimate or direct
27 contact with the casing. Therefore, it would have been obvious to one of

1 ordinary skill in the art to attach a perforating charge in direct contact with a
2 casing.

3 On the record before us, the Appellants have not shown that the
4 Examiner erred in rejecting claim 8 under § 103(a). Since the Appellants
5 grouped claims 9-12 and 14 with claim 8 for purposes of contesting this
6 ground of rejection, the Appellants also have not shown that the Examiner
7 erred in rejecting claims 9-12 and 14 under § 103(a).

8

9 *D. The Rejection of Claim 13 Under § 103(a) as Being*
10 *Unpatentable Over Snider in View of Abouav, Guerreri,*
11 *Umphries and Neyer*

12 The Appellants' contest the rejection of claim 13 under § 103(a)
13 solely on the basis of arguments relied on to contest the rejection of claims
14 1-5 and 7 under § 103(a). We sustain the rejection of claim 13 for the
15 reasons given in connection with the affirmance of the rejection of claim 1.

16

17 CONCLUSIONS OF LAW

18 On the record before us, the Appellants have not shown that the
19 Examiner erred in rejecting claims 1-5 and 7 under § 103(a) as being
20 unpatentable over Snider in view of Guerreri; claim 6 under § 103(a) as
21 being unpatentable over Snider in view of Guerreri and Neyer; claims 8-12
22 and 14 under § 103(a) as being unpatentable over Snider in view of Abouav,
23 Guerreri and Umphries; and claim 13 under § 103(a) as being unpatentable
24 over Snider, Abouav, Guerreri, Umphries and Neyer.

25

26 DECISION

27 We AFFIRM the Examiner's rejection of claims 1-13.

